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COMPARISON OF FORMOL AND WASSERMANN REACTIONS IN DIAGNOSIS OF SYPHILIS

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In a recent paper Gaté and Papacostas¹ report that the addition of a small quantity of formalin to pooled syphilitic serum led to coagulation ("Gélification"), while no such reaction took place if the serums were from nonsyphilitic patients. The work was extended with individual serums, and at the same time controlled by parallel Wassermann tests. They found in a series of 400 comparative tests an agreement of 85% between the two reactions. To obtain the best possible results these authors then advocated the following method:

"To one c.c. of a clear serum two drops of commercial formalin is added. The mixture is then gently shaken and the tube plugged with cotton. The mixture is allowed to stand for 24 to 30 hours at room temperature and the results taken." They further found that inactivation of the serum was not a necessary factor, and that serum 48 hours old or even older gave identical results when compared with the same specimen freshly drawn, but they insist that the serums should not be contaminated. Incubation temperature does not seem to modify the reaction, and pooled positives always gelify in the presence of formalin. No explanation of the reaction is given. Pauzat,² however, found that from 57 comparative tests in which 11 were Wassermann positive, only 3 reacted by the formalin method, and from 46 negatives 6 gave a positive reaction by the new method. This author therefore doubts the diagnostic value of the formol reaction.

I have applied this reaction in a series of 500 comparative tests in which the Wassermann reaction was carried out by the icebox method with 3 different antigens, namely, syphilitic fetal liver, normal human and beef heart antigens. Of the 500 tests, 7 were designated \pm reactions because of some fixation in the presence of the syphilitic liver antigen. The remaining 493 tests were + + +, + + + + or entirely negative. In reading the results of the formol reaction a dis-

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¹ Compt. rend. de la Soc. de Biol., 1920, 83, p. 1432.

² Ibid., 1920, 84, p. 503.

tinctly increased viscosity was designated as +, marked viscosity as ++, and complete coagulation as ++++. The serums were fresh and inactivated. Both Schering's and C. P. formalin were used in the determinations and in both acid and neutralized solutions. The incubation period varied from 24 to 48 hours and at temperatures of either icebox, room or 37 C. Some tubes were plugged with cotton, while others were tightly corked to prevent any loss by evaporation.

Table 1 gives the results of the series :

TABLE 1

Number of Serums Tested	Condition of Serums	Kind of Formalin Used	Incubation		No. of Wassermann Reactions		No. of Gelification Reactions		No. of Wassermanns Positive and Gelifications Negative	No. of Gelifications Positive and Wassermanns Negative	No. of Agreements
			Temperature	Time in Hours	Positive	Negative	Positive	Negative			
71	Fresh	Commercial	Room	26	24	47	18	53	18	12	6
59	Fresh	Com. neutral	Room	24	22	37	20	39	12	10	10
29	Fresh	Commercial	Room	24	3	26	11	18	1	9	2
30	Fresh	C. P. acid	Room	24	4	26	6	24	3	5	1
45*	Inactivated	C. P. acid	Room	24	16	29	18	27	9	11	7
48	Inactivated	Commercial	Room	24	10	38	8	40	8	6	2
33	Inactivated	Commercial	Room	48	5	28	5	28	3	3	2
29	Inactivated	C. P. neutral	Room	24	8	21	4	25	5	1	3
19	Inactivated	Commercial	37 C.	30	4	15	4	15	3	3	1
30	Inactivated	C. P. neutral	Icebox	30	6	24	2	28	4	0	2
49	Inactivated	Commercial	Room	25	7	42	11	38	4	8	3
58	Inactivated	C. P.	Room	48	13	45	17	41	5	9	8
Total 500	.....	.....	.....	.....	122	..	124	..	75	77	47
Percentages.....	.....	.....	.....	.....	24.40	..	24.80	..	15	15.4	9.4

* Seven Wassermanns were \pm with syphilitic fetal liver.

From this comparative summary it is seen that the total number of agreement in both tests varies considerably depending in part on variations in the formol-test technic. Of the final number of positives obtained by the new method only 37.09% were positive by the Wassermann test, the figure being markedly lower than that obtained by Gaté and his associate and slightly higher than that of Pauzat which was 27.27%. Furthermore, 44 positive tests by the formol method

were of the + type, and of these only 13 were Wassermann positives, leaving the rest unaccounted for. Four formol + positives were known negatives.

CONCLUSIONS

Of the total number of positive reactions obtained by the formol reaction of Gaté and Papacostas, only 37.09% agreed with the positive results obtained by the Wassermann method.

A large number of formol positives (44 or 8.8% of total) were of the + type, and of these 13 (or 29.54%) were positive by the Wassermann method. These weakly positive reactions tend to induce confusion, as it is often difficult to interpret these reactions.

The reaction as it stands is of no diagnostic value because of its failure to react in clinically and serologically clear cut cases of syphilis, and the occurrence of positive reaction in the absence of the disease.